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ABSTRACT

Children's use of conjunctions was examined for linguistic complexity, developmental differences, and ethnic differences. Third, sixth, and ninth grade Anglo-American, Black, and Hispanic students completed sentence fragments ending in "and," "but," "because," and "even though." These conjunctions can be paired "and-but" and "because-even though," thereby making the second member of each pair the negative of the first. The positive member of each pair proved to be easier to master than the negative one, with the overall order of difficulty (from easiest to hardest) being because-and-but-even though. This order of difficulty was constant across grades and ethnic groups. All ethnic groups showed improvement in the use of conjunctions between third and ninth grades; but Anglo-American students achieved effective mastery of each conjunction earliest, while Hispanic students achieved mastery latest. (Author/RL)

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Technical Report No. 158

A STUDY OF THE USE OF CONJUNCTIONS ACROSS GRADES AND ETHNIC GROUPS

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Abstract

This study examines children's use of conjunctions. Three major issues are addressed: linguistic complexity, developmental differences, and ethnic differences. The subjects for the study--third, sixth, and ninth graders--were of Anglo, Black, or Hispanic ethnicity. They completed sentence fragments ending in the conjunctions and, but, because, and even though. These conjunctions can be paired, and-but and because-even though, where the second member of each pair is basically the negative of the first. The data indicate that the positive member of each pair was easier than the negative one; the complete order of difficulty for the four conjunctions was because < and < but < even though. The order of difficulty was constant across grades and ethnic groups. For all ethnic groups there was improvement in the use of conjunctions between third and ninth grade. However, the grade by which effective mastery of each conjunction was reached differed for the three ethnic groups, being in general earliest for Anglos and latest for Hispanics.

A Study of the Use of Conjunctions Across Grades and Ethnic Groups

One of the most important educational issues in the U.S. today centers around the poor literacy skills of non-mainstream children. In an attempt to discover the source of the problem, many researchers have employed contrastive analysis, comparing the child's first dialect or language with Standard English, noting points of difference, and then attempting to demonstrate the effects of interference from the home dialect or language on developing literacy in Standard English. These endeavors have met with mixed success. Although in some instances contrastive analyses have been able to predict points of difficulty for the child (e.g., Labov, 1970; Hall & Turner, Note 1), in many other cases no interference has been found (e.g., Schaaf, 1971; Nolen, 1972; Hockman, 1973). Consequently, it appears improbable that differences between home and school language per se are a major source of difficulty. The work of Hess and Shipman (1965) and Bernstein (1962, 1970) among others suggests that perhaps a significant problem is not the structure of the home language but rather its usage. That is, it is possible that non-mainstream children do not learn to make full use of their linguistic resources to communicate new information and that this lack is reflected in their acquisition of literacy skills.

One important linguistic resource in communicating information is conjunctive relation. It is important because it is "a specification of the way in which what is to follow is systematically connected to what has gone

before" (Halliday & Hasan, 1976, p. 227). Conjunctions act as clues drawing attention to and making explicit the logical relationship between propositions. In oral discourse these relationships may be made clear by context. However, in the written mode, conjunctions are extremely important. Readers who fail to note a conjunction or who misunderstand it may interpret the propositions it connects as either totally unrelated or related in ways unintended by the author. Thus, they may comprehend each sentence or clause but fail to understand the passage as a whole. Conversely, authors who fail to make judicious use of conjunctions leave their readers guessing about the connections between the ideas they have presented. Single sentences may be clear; the whole, however, is vague because there are fewer clues to the logical relationships among propositions.

In this study we addressed the question of whether there are differences in the way in which mainstream and non-mainstream children use conjunctions. The conjunctions examined were and, but, because, and even though. They were selected for three reasons. First, they all occur frequently in reading materials at transition level and beyond, and thus their comprehension is very important to the developing reader. Secondly, in order to write lucidly and coherently, an individual must learn to use these conjunctions appropriately. Finally, these four conjunctions form a natural set. But may be analyzed as incorporating both the logical meaning of and and an "adversative" meaning (Halliday & Hasan, 1976), while even though may be understood as incorporating the meaning of because plus an "adversative"

meaning. Thus they constitute two pairs of conjunctions whose members differ primarily in polarity.

And and because have been analyzed as semantically simpler than their negative counterparts but and even though. It has also been demonstrated that when subjects are expected to conjoin complex sentences with either and or but, there are shorter response latencies when the expected response is and than when it is but (Hoosain, 1974). Furthermore, and is generally considered to be the simplest of all conjunctions while even though (conceived as the negation of an expected causal relationship) appears quite complex. Thus, three additional research questions present themselves: (a) Are the negative conjunctions more difficult than their positive counterparts? (b) Is and the easiest conjunction, and (c) Is even though the most difficult?

Method

Subjects

The subjects for the study were 96 Black, Anglo, and Hispanic children in third, sixth, and ninth grades in a midwestern city of about 50,000 inhabitants. The distribution of subjects by grade and ethnic group is shown in Table 1. The Black and Hispanic children came primarily from lower-class backgrounds, the Anglo children primarily from lower middle-class backgrounds. The first language of the Hispanic children was Spanish.

Insert Table 1 about here.

Materials

The materials for this study consisted of 24 incomplete sentences, each sentence consisting of an independent clause followed by a conjunction. One set of 6 incomplete sentences was used for both and and but and another partially overlapping set of 6 sentences was used for both because and even though. These sentences were as follows:

1. Sam gets good grades in school and/but . . .
2. Dad is hungry and/but . . .
3. We have a new car and/but . . .
4. We went to the movies and/but . . .
5. Mother works and/but . . .
6. Anita is pretty and/but . . .
7. He bought a TV because/even though . . .
8. Mother works because/even though . . .
9. He went swimming because/even though . . .
10. Linda is sad because/even though . . .
11. Sam gets good grades in school because/even though . . .
12. The puppy is tired because/even though . . .

Procedure

Subjects were tested in classroom groups. First, they were shown two examples which were explained orally. They then completed a practice sentence, and their responses were discussed. Afterwards, they were given a booklet containing the experimental materials. Subjects were instructed to use the blanks following the conjunctions to finish the sentences and were told to be sure that the completed sentences made sense. The sentences were presented to subjects in a random order (except that in no case were

two sentences differing only in conjunction juxtaposed), 12 sentences to a page. Half the booklets began with one page and half began with the other page.

Scoring

The subjects' responses were analyzed in terms of their semantic acceptability--that is, whether or not the given conjunction appropriately expressed the relationship between the main clause, which was sentence-initial, and the clause or phrase constructed by the subject. The semantic acceptability of each response was independently judged by both authors. Disagreements were discussed until a consensus was reached. For each subject four scores (one for each conjunction) were recorded. These scores ranged from zero to six, a perfect score.

Results

Analyses of variance. The data were subjected to an unweighted means analysis of variance with grade (third, sixth, ninth), ethnic group (Black, Anglo, Hispanic), and conjunction type (*and*, *but*, *because*, *even though*) as factors. Grade and ethnic group were between-subjects factors, and conjunction type was a within-subject factor. Table 2 gives the mean scores for the interaction of grade by ethnic group by conjunction type. Significant

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Insert Table 2 about here.

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main effects were found for grade, $F(2,87) = 12.65$, $p < .01$; ethnic group, $F(2,87) = 7.89$, $p < .01$; and conjunction type, $F(3,261) = 62.44$, $p < .01$.

A Newman-Keuls post hoc comparison of paired means performed with probability level .05 indicated that: (a) the grade effect was due to the significantly higher performance of sixth than third graders; (b) the ethnic group effect was probably due to the higher performance of Anglos, although the Neuman-Keuls analysis was unable to discriminate between paired means at the .05 level; and (c) the conjunction type effect was due to the fact that for all pair wise comparisons the means were significantly different, the order of difficulty of the conjunctions being *because* < *and* < *but* < *even though*.

In addition to the main effects, there were also significant interactions of grade with conjunction type, $F(6,261) = 5.94$, $p < .01$, and ethnic group with conjunction type, $F(6,261) = 3.83$, $p < .01$. Neither the two-way interaction of grade by ethnic group nor the three-way interaction of grade by ethnic group by conjunction type were significant at the .05 level. T-test pair-wise comparisons of means were run to analyze the interactions. The results showed that the grade by conjunction type interaction was due to the fact that, while there is a significant improvement in all conjunction scores between third and sixth grade (*and*, $t[61] = 3.48$, $p < .001$; *but*, $t[61] = 5.00$, $p < .001$; *because*, $t[61] = 3.60$, $p < .001$; *even though*, $t[61] = 6.49$, $p < .001$), between sixth and ninth grade the only scores showing significant improvement are those for *even though* ($t[64] = 3.52$, $p < .001$).

The ethnic group by conjunction type interaction was due to the fact that Anglos performed significantly better than Blacks on the conjunctions *but*, $t(62) = 2.21$, $p < .05$; and *even though*, $t(62) = 5.89$, $p < .001$; Blacks

performed significantly better than Hispanics on the conjunctions and, $t(59) = 1.92$, $p < .05$; and but, $t(59) = 2.35$, $p < .05$; and Anglos performed consistently better than Hispanics on all conjunctions (and, $t[65] = 3.02$, $p < .01$; but, $t[65] = 4.76$, $p < .001$; because, $t[65] = 2.10$, $p < .05$; and even though, $t[65] = 5.48$, $p < .001$).

Correlations. The students who participated in this study had recently taken the Stanford Achievement Test, and Pearson's r was calculated for the pairwise comparison of the vocabulary, comprehension, and total reading scores from this test and each of the conjunction scores. All comparisons resulted in significant positive correlations, that of the paired even though and vocabulary scores ($r = .71$, $p < .01$) being almost as high as that between vocabulary and comprehension scores ($r = .75$, $p < .01$).[1] Interestingly when Pearson's r is calculated separately for each ethnic group, the paired conjunction-reading score correlations for the Hispanics are greater than for the Anglos in 10 of 12 cases, and greater for Blacks than Anglos in 8 of 12 cases (see Table 3).

Insert Table 3 about here.

Pearson's r was also calculated for all pair-wise comparisons of conjunction scores (see Table 4). The intercorrelations of but, because, and even though were significant for all ethnic groups. The correlation of and with all other conjunction scores was significant for Hispanics, but only the correlation of the scores on and and even though were significant for Anglos. None of the correlations with and were significant for Blacks.

All correlations except that between because and even though were higher for Hispanics than for the other two groups.

Insert Table 4 about here.

Step-wise multiple regressions. In order to compare the relationship of conjunction scores to reading scores across ethnic groups, two step-wise multiple regression analyses with a .05 significance level were performed on the data for each ethnic group, the first to determine the variables which best predict reading comprehension scores, the second to determine the variables which best predict total reading scores (see Table 5). The variables considered in each case were age, grade, and the scores on each of the four conjunctions.

Insert Table 5 about here.

With respect to reading comprehension, the variables which were entered and had a significance level of .05 or better were: (a) for Anglos, only the score on even though; (b) for Blacks first grade, the score on because; and (c) for Hispanics, only the score on but. With respect to total reading, the variables which were entered and had a significance level of .05 or better were: (a) for Anglos, the score on even though; (b) for Blacks, the score on even though; and (c) for Hispanics, the score on but.

Discussion

Our findings indicate the following order of difficulty for the four conjunctions studied: because < and < but < even though. Thus we found that as hypothesized the positive term of each of the two conjunction pairs (and in the pair and-but and because in the pair because-even though) is easier than the negative one. However, while on the basis of a preliminary linguistic analysis we expected the easiest conjunction to be and, we found instead that it is because. Our findings are thus in line with Vygotsky's (1962) view that causal relations appear before adversative relations, and with the research of Katz and Brent (1968) which indicated that both first and sixth grade subjects showed greater understanding of because than of but and although. However, with respect to the relative difficulty of but and although (even though in the present study), our findings are somewhat at variance with those of Katz and Brent. Although in a spontaneous speech situation they found no use of although at either first or sixth grade whereas but was used by more sixth than first graders, in a forced choice task both first and sixth graders performed equally well on the two conjunctions. Our findings are also at variance with those of Robertson (1968) who found that subjects in grades four to six performed significantly more poorer on and and although than on because and but. Perhaps the discrepancy between our findings and those of Robertson and of Katz and Brent are the result of different materials (subject generated sentence completion in the present study versus forced choice in the others).

When we consider the semantic and affective factors which influence what can be joined with the four conjunctions we are studying, the reasons for the order of difficulty that we found become clear. Of these four terms, because is the most limited; it introduces a clause which gives a reason or cause for the action described in the main clause. This means when a child is searching for a reasonable conclusion for a sentence fragment ending with because, his/her goal is highly specified. Stein (Note 2) has shown that children's ideas about causality develop early. Children as young as four and a half have little difficulty discriminating causes from consequences. Thus, if sentence fragments describe events or conditions with which they are familiar, we would expect children to be able to provide reasonable causes for those events or conditions. This is what we found. When we asked our youngest subjects to complete the fragment, "Sam gets good grades in school because . . .," they supplied us with such answers as "he works," "he is smart," and "he is good." (Incidentally, many children in grades 3 and 4 gave "he is good" as the cause of Sam's good grades, which suggest that these children see conduct as the principle ingredient of a satisfactory report card!) Even when there were considerable problems with spelling and grammar, it was clear that the causal relationship was present, as the following examples show:

He went swimming because it was hot.
Sam gets good grades in school because he was never apsent.
Mother works because we nende mune.

Only rarely did we find such an erroneous use of this conjunction as:

Sam gets good grades in school because he's no good.

In this sentence, the propositions would normally be conjoined with even though, indicating that the proposition expressed in the independent clause runs counter to the expectation set up by the dependent clause. Isolated cases in which children attempted to use because to conjoin two contradictory propositions were also found as in:

Linda is sad because she is happy.

As we would expect, older subjects had very little difficulty with these sentence types. We noticed that in the older groups, certain sentences elicited a very limited number of responses, which suggests that there is a high degree of agreement on the causes of certain behaviors:

We bought a TV because . . .
Mother works because . . .
He went swimming because . . .

On the other hand, one sentence frame elicited very diverse responses, all of which were judged to be highly acceptable:

Linda is sad because . . .

Apparently subjects felt there were many more reasons for feeling sad than for buying a new TV, working, or going swimming.

And and but are not as highly constraining as because; rather, the factors affecting the acceptability of sentences with and and but are relatively subtle.[2] When the completion responses were examined, we found a much greater number of unacceptable or odd sentences in all three groups of

subjects than we did for the causal relationship. Osgood (1973), in a comprehensive analysis of adult use of and and but in conjoining adjectives, found that and was used when there was congruence in terms of the polarity of the two adjectives. If both adjectives were considered either favorable or unfavorable attributes, they could be joined by and. However, if one was favorable while the other was unfavorable, but was the usual choice for joining them in one sentence. For example, most people consider beauty and generosity good attributes, while ugliness and selfishness are negatively evaluated. Now consider the following six sentences (where we have indicated with a question mark which sentences are considered odd):

She is beautiful and generous.
She is ugly and selfish.
She is beautiful but selfish.
? She is beautiful and selfish.
She is ugly but generous.
? She is ugly and generous.

One persistent form of error we found at all three age levels involved this aspect of and and but. Adjectives that were not similar in terms of polarity (positive/negative) were conjoined with and. For example, from both third and sixth grade, we got the sentence, "Anita is pretty and fat." Since prettiness but not fatness is evaluated positively in this culture, this sentence would sound much better with but, as would one supplied by a ninth grader: "Anita is pretty and a brat." Conversely, some adjectives with the same polarity were conjoined with but as in this sentence produced by a third grader: "Anita is pretty but nice." In some cases the children

appeared to realize there was a polarity problem and supplied the appropriate conjunction,[3] creating a nongrammatical entence:

Dad is hungry but and sad.

Another set of problems involved saying complete opposites about the same individual, as in the sentences, "Dad is hungry but full," and "Anita is pretty and ugly," given to us by third and sixth graders. Even a sentence where opposites are attributed to different people would sound much better when but is used, as this sixth grade example shows: "Anita is pretty and her brother is ugly."

Another bizarre form of error that was noted has been described by Robin Lakoff (1971). Certain characteristics or traits presuppose others, and these latter characteristics are not normally spelled out since they are part of the average person's knowledge of the world. Lakoff's examples are, "John has a Ph.D. in linguistics and he can read and write." "Felix is a cat and he has four paws" (Lakoff, 1971, p. 125). We found sentences showing exactly this quality of "spelling out" information presupposed by the sentence fragment they were completing:

Anita is pretty and she is a girl.

Sam gets good grades in school and gets an A.

In our youngest group, cases with complete redundancy or partial redundancy through synonymy were also found:

Dad is hungry and hungry.

Anita is pretty and beautiful.

We have mentioned several things that tend to make sentences with and and but peculiar: (a) opposition in the polarity of the two adjectives and the use of and, (b) the predication of complete opposites about the same individual, and (c) the explicit statement in the second part of the sentence of information presupposed by the first part. However, when we look at all the deviant sentences produced by third, sixth, and ninth graders, we find a large group that cannot be related to any of these problems. These problems can be related to the basic condition that conjoined sentences must share a common topic or that one sentence must be relevant to the other. Some sentences conjoined by and or but are obviously related; others require readers to make more assumptions or deductions to grasp why they are conjoined. This distinction can be shown by two examples from subjects' protocols:

We went to the movies and we saw King Kong.
We went to the movies and we sweat to [too].

Finally, there comes a point where the number of deductions necessary makes the reader judge the sentence as ill-formed. In this sentence from a third grader, "Anita is pretty and wants a dog," it is difficult to understand the relevance of being pretty to wanting a dog. There appears to be no common topic. We can understand a sentence such as this one from a sixth grader, "Anita is pretty but she had lost her book," only if we believe that it is a general truth that pretty girls do not lose books.

Upon examining the errors in the use of and discussed above, it becomes evident that the vast majority occurred when and was used additively to

predicate two qualities of the same subject. There is, however, another use of and, that in which it expresses a sequential relationship:

He went to the boxing arena and saw an exciting fight.

The clauses in a sentence expressing a sequential relationship cannot be reversed, while additive conjuncts can be:

Insert your check and seal the envelope.
*Seal the envelope and insert your check.
She is talented and beautiful.
She is beautiful and talented.

In our data, sentences in which and was used sequentially were error-free. Furthermore, whether and was used additively, sequentially, or causally depended on the nature of the given clause. And invariably occurred in an additive sense with the clause, "Anita is pretty," while "We went to the movies" was the one most apt to produce sequential meanings of and.

Despite the fact that even though, like because, has a very limited and precise meaning, this conjunction presented even more difficulty to our subjects than did and and but. Even though conjoins clauses when there is an unexpected condition, as in, "John skis even though he has only one leg." Because and even though can be considered semantically related because the former describes a condition which causes the event or action described by the main clause, while even though marks a condition which would normally be expected to prevent the action or event of the main clause but does not. Thus even though can be conceived as expressing the negation of an expected causal relation. This relationship can be shown by the following pair of sentences:

We didn't go boating because it was raining.
We went boating even though it was raining.

Many of our subjects appear to have identified the causal element in the meaning of even though but failed to identify its negative element. Thus, many of the completions for sentence fragments ending with even though were causes. That is, we found information encoded in the dependent clause that would be appropriate for sentences with because. For example, both a third grader and a sixth grader produced the sentence:

We went swimming even though it was hot.

Similarly, the same proposition that elicited a number of very good causes from our sixth grade subjects when it was followed by because continued to elicit good causes even when we were asking for unexpected results. Thus, in response to the sentence fragment, "Linda is sad even though . . .," we got the following responses:

she has lost her cat.
she didn't get to go skating.
she got a spanking.
she hungry.

This confusion persisted into the ninth grade, as the following examples show:

Sam gets good grades in school even though he trayed hard.
The puppy is tired even though it's been playing all day.

Some of our subjects clearly expressed their understanding of the causal element in even though and the semantic relationship of that term to because. For a few sentence fragments ending with even though, they

added because and completed the sentence with an appropriate cause, yielding the following sort of ungrammatical structures:

Mother works even though because she likes to work.

Sam gets good grades in school even though because he is good.

Because was not added to fragments ending with and or but.

In other cases children appear to have mastered both meaning components of even though--negation and causation--but failed to note that the conjunction immediately precedes the condition which, counter to expectation, fails to prevent the action/event of the main clause. Thus we get sentences in which the conjunction precedes the main clause, as in the following sentence produced by a sixth grader:

The puppy is tired even though I am going to run him.

The intended meaning of this sentence was probably, "Even though the puppy is tired, I am going to run him."

Let us now consider the question of whether there are differences in the ways in which children of different ethnic groups handle the conjunctions. We have found no evidence for differences in the order of difficulty of the four conjunctions. However, the groups can be rank ordered with respect to their absolute scores on the conjunctions. Anglos performed significantly better than Hispanics on all conjunctions and better than Blacks on but and even though, while Blacks performed significantly better than Hispanics on the conjunctions and and but.

Furthermore, there appear to be differences in the grade by which mastery of the conjunctions is approached. If we define mastery operationally as a

conjunction score of six, then in fact no ethnic group achieves mastery of any of the conjunctions by ninth grade. However, if we consider a score of five to reflect adequate ability to handle a conjunction, then we find that Anglos have mastered because and almost mastered and and but at third grade. By sixth grade, they have mastered all the conjunctions. Blacks have not mastered any of the conjunctions at third grade, although they are approaching mastery of because and and. By sixth grade, they have mastered all but even though, and by ninth grade that, too, has been mastered. The Hispanics do not show mastery of any of the conjunctions until sixth grade, at which point they appear to have mastered because and to be approaching mastery of and. At ninth grade, all of their scores, with the exception of those on even though, are lower than at sixth grade although the differences are not statistically significant. This decrease in scores from sixth to ninth grades may reflect later entry to English language schools on the part of the ninth graders as compared to the sixth graders. The fact that the ninth graders' scores on even though are higher than those of the sixth graders may indicate that the cognitive development necessary for the correct use of even though occurs later than that needed for the correct use of and, but, and because. Correct use of the latter terms in the grades studied may then be dependent only on a certain degree of second language acquisition.

The three ethnic groups do not differ only in the grade by which they approach mastery of the various conjunctions. They also differ in the pattern of correlations among their conjunction scores and between their conjunction scores and their reading scores. For Hispanics, all possible correlations

between conjunction scores are high. For Anglos and Blacks, only the correlations between scores on but and because, but and even though, and because and even though are high. The high correlation among all the conjunction scores for Hispanics is probably a reflection of the low degree of mastery of all of the conjunctions exhibited by the group as a whole and also an indication that, for them, the task was basically a vocabulary test or translation task. For the Anglos and Blacks, it is possible that the task was more a cognitive test, one of determining possible logical relationships among propositions. Thus, performance on and, which may be used when a variety of logical relationships exist between propositions, is not highly correlated with performance on the other conjunctions, each of whose use is much more constrained with respect to the logical relationship existing between propositions which it may appropriately conjoin. We find too that, except with respect to the score on even though, Hispanics' conjunction scores correlate more highly with their reading scores than do Blacks' or Anglos'. This fact suggests that for Hispanics it is possible that there is some common underlying factor accounting for both their performance on this task and on reading tests, for example a lack of familiarity with English (supported by the high correlation of vocabulary and conjunction scores), and/or that their lack of ability to handle conjunctions appropriately impedes their reading ability. Support for this latter position may be found in the results of a step-wise multiple regression analysis performed to determine the best variables to predict total reading score for Hispanics. The best

predictor was their score on but. In fact, this score was the only predictor significant at better than the .05 level.

Finally, there is some difference in the content of the propositions that Black children as opposed to Anglo and Hispanic children chose to complete the sentences given. In some cases, the appropriateness of these propositions is not immediately obvious to someone of different background. For example, in completing the sentence, "We have a new car but . . .," several Black children used the proposition, "we have a house to live in." But may seem to be an inappropriate conjunction with which to conjoin the given clause with the one provided by the children. However, when we consider the common stereotype that Blacks spend their money on cars in preference to housing, we can see a reason for the use of a conjunction which implies that the following proposition is contrary to expectation. In other cases while there is no difficulty in accepting a proposition as appropriately following a particular conjunction, its use indicates the ethnicity of the child. Only Black children, for example, completed the sentence, "Anita is pretty and . . .," by referring to skin tone, producing such sentences as, "Anita is pretty and light with red hair."

Conclusion

In this study we found evidence for an order of mastery of the four conjunctions and, but, because, and even though. That order is: (a) because, (b) and and but, and (c) even though. This order was the same for all three groups studied--Anglo lower middle-class children and Black and Hispanic lower-class children. The rate of acquisition, however, appeared

to differ in the three groups. Anglos showed mastery of because at third grade and of the remaining conjunctions by sixth grade. Blacks indicated mastery of all but even though by the sixth grade and of even though by the ninth grade. Hispanics, however, while they exhibited mastery of because at the sixth grade, failed to exhibit mastery of the remaining conjunctions by the ninth grade. We also found that, although for all groups conjunction scores were highly correlated with, and better predictors of, reading scores than were age or grade, these relationships were strongest for the Hispanics.

When we considered the production of sentences for the four conjunctions, we found that the one that was easiest for our subjects, because, is the one that is most limited semantically. However, the most difficult conjunction, even though, is also rather highly constrained: it may only introduce an event or action that would be expected to prevent whatever is described in the main clause. We must assume therefore that the difference in difficulty of because and even though is related to the fact that we usually talk and think about reasons why things happen rather than about factors that unexpectedly fail to prevent an activity. And and but range between these two extremes. In the case of these conjunctions, there are several factors influencing their use, all of which are subtle and depend, to a considerable extent, on a rather sophisticated or mature knowledge of the world.

There are several implications for teachers in these findings. First, since for all groups conjunction scores were highly correlated with and better predictors of reading scores than were age or grade, mastery of conjunctions appears to be important to reading comprehension.

Second, causal relationships appear to be grasped easily even by young children. Our findings together with those of Stein (Note 2) indicate that there is little need to teach them explicitly in the classroom. Children appear to be able to both encode and decode them easily in the written mode.

Third, children appear to have a certain amount of difficulty in using and correctly in writing and could profit by instruction aimed at pointing out: (a) that and has sequential, causal, and additive meanings; (b) that the additive use of and implies that all propositions so conjoined be related to a common topic; (c) that qualities conjoined by and share the same polarity; (d) that and is not used to conjoin a clause presupposed by a preceding clause; and (e) that and is not used to conjoin tautologous or contradictory elements. Despite the fact that failure to be aware of the points listed above may result in the erroneous use of and in composition, such failure probably has little or no effect on reading comprehension. The reader can infer the correct relationship between propositions simply by processing them sequentially.

Fourth, children also have difficulty with but. But is used to conjoin qualities of opposite polarity and to express negated expectation in sequentiality, causality, or additivity. These facets of but should be pointed out to students not only so that they may appropriately use but in writing but also so that, as readers, they will be able to understand the nuances in the texts that they encounter.

Fifth, it is clear that even though poses a major problem for students. While it is possible that the difficulty resides solely in a failure to

comprehend the linguistic form, we feel that it is more probable that in part the problem is one of failure to understand the logical relationship indicated by the form. If the latter is the case, children will have great difficulty in comprehending textual materials using this form and should be given many examples of its proper use as well as being encouraged to compose their own sentences using it. Mastery of all of the conjunctions will, we feel, be aided by the opportunity to compose sentences using them, followed by discussion of these sentences. For this purpose, teachers might want to use exercises such as those used in this study.

Finally, teachers should be aware that children from lower socio-economic minority groups may lag behind mainstream groups in mastery of conjunctions and need extra help. Such a lag might partially account for the finding that although children seem to have little or no trouble decoding, their comprehension is low. Contrary to expectation and to a study comparing responses of subjects from two different countries (Steffensen, Joag-dev, & Anderson, 1979), we failed to find any effect of culture on what things were seen to be logically related and in what ways.

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Footnotes

[1]In this context we should point out that Robertson (1968) found correlations between STEP reading test scores and conjunctions scores of: .728 for *although*, .685 for *because*, .684 for *but*, and .647 for *and*.

[2]The possibility that "students may have trouble linking ideas with *and* since there are a wide variety of meanings attributed to this connective" has also been noted by Robertson (1968, p. 406).

[3]Inserting another conjunction or simply ignoring the one present and completing the sentence fragment with a prepositional phrase were strategies used by the children no matter which conjunction was given.

Table 1

Distribution of Subjects

by Grade and Ethnic Group

Grade	Ethnic Group		
	Black	Anglo	Hispanic
Third	10	10	10
Sixth	12	12	9
Ninth	7	13	13

Table 2

Mean Conjunction Scores

By Grade and Ethnic Group

Ethnic Group	Because	And	But	Even Though
		Third Grade		
Anglo	5.4	4.9	4.9	3.0
Black	4.5	4.5	3.8	1.2
Hispanic	4.6	4.1	3.3	2.0
Combined	4.8	4.5	4.0	2.1
		Sixth Grade		
Anglo	5.8	5.7	5.9	5.4
Black	5.8	5.5	5.3	3.0
Hispanic	5.7	5.0	4.7	2.8
Combined	5.8	5.4	5.3	3.7
		Ninth Grade		
Anglo	5.9	5.6	5.2	5.5
Black	5.4	5.4	5.3	5.1
Hispanic	5.2	4.9	4.5	3.2
Combined	5.5	5.3	5.0	4.6
		Combined		
Anglo	5.7	5.4	5.4	4.6
Black	5.2	5.1	4.8	3.1
Hispanic	5.2	4.6	4.2	2.7
Combined	5.4	5.1	4.8	3.5

Table 3

Correlation Between Conjunction and Reading Scores by Ethnic Group

Ethnic Group	and	but	because	even though	Vocabulary	Comprehension	Total Reading
			Vocabulary				
All Subjects	.47***	.46***	.44***	.71***	-	.75***	.77***
Blacks	.31N	.33N	.38N	.75***		.75***	.73***
Anglos	.47**	.27N	.30N	.63***		.74***	.78***
Hispanics	.49**	.55N	.52***	.54***		.47*	.54***
			Comprehension				
All Subjects	.38**	.47***	.46***	.62***	-	-	.95***
Blacks	.32N	.38N	.61***	.67***			.88***
Anglos	.33N	.33N	.35*	.56***			.95***
Hispanics	.38N	.58***	.47*	.42*			.91***
			Total Reading				
All Subjects	.44***	.49***	.46***	.66***	-	-	-
Blacks	.26N	.31N	.50***	.60***			
Anglos	.39*	.34N	.37*	.59***			
Hispanics	.56***	.71***	.55***	.63***			

N = Not significant

* $p < .05$

** $p < .02$

*** $p < .01$

Table 4

Intercorrelations of Conjunction Scores

by Ethnic Group

Ethnic Group	and	but	because	even though
		and		
All Subjects	-	.58***	.56***	.51***
Blacks		.17N	.15N	.33N
Anglos		.21N	.01N	.38*
Hispanics		.76***	.83***	.59***
		but		
All Subjects		-	.65***	.67***
Blacks			.40*	.49*
Anglos			.65***	.54***
Hispanics			.72***	.76***
			because	
All Subjects			-	.54***
Blacks				.50***
Anglos				.65***
Hispanics				.48***

N = not significant

*p < .05

**p < .02

***p < .01

Table 5

Calculation of Step-Wise Multiple Regression

Ethnic Group	Step No.	Source	F	β
		Total Reading Scores		
For All Subjects	1	even though	63.46	.66
	2	age	6.89	.23
For Anglos	1	even though	17.94	.59
For Blacks	1	even though	13.08	.60
For Hispanics	1	but	22.467	.71
		Reading Comprehension		
For All Subjects	1	even though	52.07	.37
	2	grade	13.03	.34
	3	race (var. 3)	4.90	-.19
For Anglos	1	even though	15.31	.56
For Blacks	1	grade	19.70	.54
	2	because	9.89	.43
For Hispanics	1	but	11.25	.58

Note. Variables entered are significant at the .05 level.

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